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ABSTRACT

The research and practical questions about the internal lexicon, the associated network of internal representation basic to word meaning, boil down to whether in reading English the phonological route is obligatory or optional. Since the English writing system is morphophonemic, not phonetic, access to the internal lexicon cannot and should not just be at the surface, phonetic level. Simplified spelling cannot quite bring out much of the relevant information in the English writing system. Teachers must balance phonic subskills and reading comprehension even in primary grade classes. The concept of internal dictionary must be broadened to that of an internal encyclopedia or internal library. Fast, accurate decoding of words is necessary but not sufficient for comprehension of text. Research on the reading process has led to schema theory, which postulates that story comprehension evolves around high-level representation of schemata that helps to organize and integrate a story and makes it comprehensible and recallable. The idea that comprehension of text, memory, and knowledge are interwoven means that teachers will have to teach learning strategies explicitly and should be wary of "simplified" stories. The interactive nature of the reading process underscores the importance of both the structure and function of language. Replacing formal, rigid language and reading instruction with instruction that stresses the flexibility and ambiguity of language will produce better teaching methods. (JL)

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READING WORDS AND READING TEXT

Paper read at the Nineteenth Annual Conference, United Kingdom Reading Association, Newcastle-upon-Tyne, 19th-23rd July, 1982

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In the world of literature we may recall Dr. Samuel Johnson's love for grandiloquent words such as his defining a hole as "an orifice in an edifice." Sir Ernest Gowers (1954, p. 105) similarly reminds us of another lover of rotund phrases, Mr Micawber, "'that your peregrinations in this metropolis have not as yet been extensive, and that you might have some difficulty in penetrating the arcana of the Modern Babylon . . . in short,' said Mr Micawber in a burst of confidence, 'that you might lose your way . . . .'" Such is the power of words!

In the psychology and pedagogy of reading it is all too clear that the reading task relates to both words and textual materials. As is generally agreed, reading is the interpretation of meaning from text. For readers to do this, they must be able to: (a) decode written symbols to sound, (b) draw on their internal dictionary (the lexicon) or the internal encyclopaedia to extract meaning from both words and text, and (c) incorporate this meaning into their language acquisition process. For the purpose of this paper, we will examine both lexical meaning and text processing. We will discuss the relationship between the two and will draw implications for teaching.

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Lexical Meaning

The question of how words are read for meaning was often discussed in the past under the broad topic "vocabulary." While this is still a useful term, a more precise concept for the abstract, associated network of internal representation basic to word meaning is the *internal lexicon*. The lexicon consists of all the information that readers have acquired about words of their language. There are subsystems of *lexical entries* including specifications of the meaning of a particular word, of its pronunciation and of its spelling. In this section, we will discuss how word meaning is accessed and will draw some implications for teaching.

Accessing the Lexicon

The question of lexical access evolves around: (a) that the access code during reading is phonological and indirect, (b) that the access code is visual and direct, and (c) that there are dual phonological, visual codes. These different views are represented in Figure 1.

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Insert Figure 1 about here
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There are arguments for and against the above views (see Downing & Leong, 1982, Chapter 9, for a detailed discussion). Suffice it to say that the research and practical questions boil down to whether or not in reading English the phonological route is *obligatory* or *optional*. Research literature does not provide clearcut answers. It is often thought that children, compared with adults, are less skilled and are more prone to use the indirect path or phonological coding in word recognition. There is, however, persuasive evidence for using both the phonological and visual

access routes, depending on the ability of the readers and the words to be accessed. In our laboratory, we have obtained evidence to show that less skilled readers are also less efficient in using the phonological coding system. What is not certain is whether or not these are less skilled readers because of their less efficient phonological knowledge; or whether it is because of their inefficient reading that they are deficient in phonological coding.

This discussion of phonological and visual coding can be seen as one of using an *orthographic mechanism* and a *lexical mechanism* (see Baron & Strawson, 1976). The orthographic mechanism uses the relations between letter patterns and sounds; and letters, letter groups or phonemes are the effective units. The lexical mechanism relies on specific knowledge of pronunciations of particular words and morphemes. Readers normally will use both mechanisms—the orthographic mechanism in pronouncing words that they have not seen before and the lexical mechanism for words for which no rules are available. This flexibility of approach is needed as the English writing system is not a phonetic one; but is *morphophonemic*. This means lexical items are transcribed morphemically as a morpheme carries both semantic and phonological values. It is the morphophonemic property of the English orthography which explains such verb-adjective relation as CORRODE-CORROSIVE, SUBMIT-SUBMISSIVE and not the surface phonetic property. The change for verbs ending in /d/ (with a few exceptions) and ending in /t/ preceded by /mi/ into adjectives by changing the final sounds into /s/ and adding the suffix /iv/ is in accordance with what is known as *spirantization rule* which converts dental stops to [s] if unvoiced or to [z] if voiced.

In explaining the link between the spoken and the written forms of

language, Chomsky and Halle (1968) postulate that the spelling and syntactic forms of a word are used to bring about lexical representation. Then rules are applied to produce a sequence of phonemes and an appropriate stress pattern. This latter is governed by complex factors of phonemic distinctions, morphemic structure and syntactic functions. An example will illustrate this. In the following panel of sentences the use of intonation in the spoken form gives the words in block letters a different emphasis from that of the written form:

(1a) Who won the football game?

(1b) The SASKATCHEWAN ROUGHRIDERS did.

The second sentence presupposes that there was a football game [American style] and the contrastive stress brings out the meaning. Similarly, in the following panel, the focus in (2a) is "the present" while in (2b) it is "John":

(2a) Did Dick give John the PRESENT?

(2b) Did Dick give the present to JOHN?

In addition to the different focus of the above sentences, meaning is also determined by surface structure. The one difference between the spoken and the written form of language is that the spoken form is much more context-embedded, while the printed form is less context dependent and allows for more interpretations.

Some Implications

Reference has been made to the nature of the access code of the internal dictionary, the lexicon. Access cannot and should not just be at the surface, phonetic level. Access has to relate to the underlying, deep level of representation as this is how the English orthography is structured.

It is for this reason that simplified spelling cannot quite bring out much of the relevant information in the English writing system. It is also for this reason that we should examine the careful balance between teaching phonic subskills and reading comprehension, even in lower primary classes. While some children need consistent and intensive work in phonic subskills (eg. vowel digraphs, so-called "silent e" and other aspects), many children can be challenged to read for inferences, for critical evaluation and to bring their world knowledge to bear on developing both word knowledge and comprehension.

Thus the concept of the internal dictionary needs to be broadened to that of the internal encyclopaedia, or, better still, the internal library. For there is not one lexicon, but probably different dictionaries. In Roget's Thesaurus, for example, words are classified according to topics; there can be dictionaries classified in other ways. Semantic representation must include: the dictionary, semantic rules and semantic interpretations (see Katz & Fodor, 1963). An analysis of the word(s) BACHELOR by Katz and Fodor is a good example. The dictionary entry shows the word BACHELOR as meaning an unmarried male or one with an academic degree, among other definitions. But these two meanings can be as unrelated to each other psychologically as are the two different senses of ACCOUNT (money deposited with a bank) or ACCOUNT (statement); the several meanings of PEN and many other polysemous words. What the two senses of BACHELOR share in common are that they are subordinate to the superordinate category of "humans." In terms of distinctive semantic features BACHELOR has these markers: [+ Noun, + Count, + Common, - Abstract, + Human, + Unmarried]. This semantic feature approach suggests that words and concepts are organized

hierarchically. This is further illustrated in Figure 2. While many words

Insert Figure 2 about here

are organized in this way, others can be grouped in a different scheme, depending on the particular semantic domain involved. Some words can be ordered in different multidimensional space: by percept (as for example colour terms), by relation ("some," "few," "all" and others), by function ("knife is for cutting") and so on. Thus when we examine some of the extant vocabulary tests we begin to wonder if they are not leaning overly on dictionary entries to the exclusion of the other semantic domains. A case in point is a vocabulary subtest item in a recent language test which gives "heifer, bovine" as the correct answer to the meaning of the word COW. Here is the rub. To a child, an animal such as a cow is defined by its attributes (eg. it's big, it has a tail, it says moo . . .); by its function (eg. it gives milk, it gives us beef). In short, the child's practical knowledge over and above dictionary entries should be taken into account.

Comprehending Text

Semantic Representation

The question of word knowledge brings us to the core of reading--that of comprehending textual materials. There is considerable evidence that fast, accurate decoding of words is necessary, though not sufficient, for comprehension. Knowing words alone will not tell us much about the meaning of textual materials. In the last decade or so, converging studies from linguists, cognitive psychologists and researchers in artificial intelligence have all emphasized *processes* of reading. From a linguistic

perspective, Fillmore (1968) discusses verb-noun relationship and its extension in his *case grammar*, which forms much of the basis for current analysis of information in text materials. Halliday and Hasan (1976) discuss discourse structure and text cohesion. From a psychological perspective Kintsch and van Dijk (1978) propose a psychological processing model in terms of propositional representation and of the arrangement of these propositions into text base. Anderson (1977) has elucidated schema theory derived from the work on the constructive nature of memory of Bartlett (1932). The artificial intelligence counterparts of the Bartlett schemata are the scripts of Schank and Abelson (1977). In artificial intelligence terminology, a schema consists of a well-organized *semantic network* of *variable slots* which must be *instantiated* or filled with values within *variable constraints*. As an example, the general theme of "dining out" will have "food schema" which can be filled with particular instances of "menu," "selection of food," "form of payment" and the instantiation of these different slots with different values according to the world view of the writer/reader.

Thus understanding of text, especially of short stories, involves understanding of related slots to be filled by specific goals or events of the protagonist in a particular story. There are rules governing the relationship weaving the theme or focus, the plot or action, the setting and the resolution of the goal of the story. This is illustrated in Figure 3. Thus story comprehension evolves around high-level representation

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Insert Figure 3 about here

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of schemata, which helps to organize and integrate a story and makes it comprehensible and recallable.

Some Practical Examples

An example taken from a task used by the present author to study the comprehension of ambiguities will illustrate the need for organization:

> John Singh lives in Africa. People there walk from village to village and like to carry things on their heads. One day John wanted to take some butter to his grandmother in the next village. He put the butter in a leaf and placed the leaf on his hat. When he got to his grandmother's house he found the butter was all gone.

The plan or structure of the story is along these lines:

WHO is (the agent) ? - John

WHAT did he do ? - carrying butter to his grandmother

WHERE did this take place ? - Africa

WHAT happened ? - the butter melted

In reading the above story, readers need to engage in a number of activities. They have to read fast. They will skim through some words but will selectively dwell on other words. They will use their knowledge of the world to predict the likely outcome of certain events. As an example, knowledge of geography will help to conjure up the image of the hot climate in Africa, its mode of travel from village to village and the custom of carrying things on people's heads. This knowledge will enable readers to predict the likely outcome of the development of the story. All along, readers should be encouraged to expand their background knowledge, to set up plans and goals, to test out different hypotheses about the resolution of these goals. For their part, teachers will need to teach learning strategies explicitly. In prose learning, this includes analyzing components and links of components, detecting errors and self-correcting

them, testing for inferences and integrating information. To complement this aspect of helping children to monitor their comprehension, the structure and organization of text materials must be carefully studied and controlled. As an example, attempts at "simplifying" texts for young children and poor readers with the use of short or unconnected sentences often militate against the constructive and integrative processes so essential to comprehension. Downing and Leong (1982, Chapter 10) have discussed at some length the schema view of reading; the importance of linguistic devices to aid text cohesion and the representation of meaning in prose.

Comprehension of text, memory and knowledge are interwoven. Bartlett (1932) emphasized remembering as an "imaginative reconstruction." This reconstruction brings together new and old knowledge and also brings out the old paradox in Plato's *Meno*. The paradox is that we cannot come to know new information unless we have some prior knowledge, and yet we cannot acquire this knowledge unless we have learned it. Thus, to return to our analogy of the internal dictionary, the internal encyclopaedia, and the internal library, the purposes of reading and, for that matter, the purposes of schooling, should not be just to fill the figurative library with books but to help to devise interrelated index systems. With such systems, information can be processed and placed in an organized structure of knowledge.

Concluding Remarks

The interactive nature of the reading process underscores the importance of both the structure and function of language. Far too often,

language or reading is taught as a rigid, formalized system rather than as an activity to be enjoyed for its own sake. So-called work books often overlook the flexible, manipulative aspect of language. A typical example of re-arranging jumbled words to form a sentence: "john delicious two baked cakes" simply gives as *the* correct answer this version: "John baked two delicious cakes." A flexible approach will also accept and, in fact, should encourage children to discuss such apparently incongruous sentences as:

* Two cakes baked delicious John.

* Delicious John baked two cakes.

These ill-formed sentences are acceptable, given certain context such as a fairytale setting. It is through this kind of language awareness (see Downing & Leong, 1982) that we can help children to grow to love reading for its own sake.

Following and expanding on the early work of Reid (1966) and Downing (1970), . . . I have been studying empirically the way in which language awareness affects reading. In an earlier project, Leong and Haines (1978) studied beginning readers' analysis of words and sentences. Children in primary one, two and three found syllable segmentation easier than phoneme segmentation and "high complexity" sentences involving embedding more difficult to imitate than "low complexity" sentences equated for sentence length. What is more, awareness of phonological representation of sounds in words contributes significantly to reading performance in a canonical correlation. These results show that reflection on and manipulation of words and sentences will go a long way towards helping readers in early primary years. In another study Leong and Sheh (1982, in preparation)

have used multivariate techniques to tease out the relationship between cognitive processing (simultaneous or successive), language awareness (understanding of language rules, ambiguities and incongruities) and reading (word recognition) in primary two and primary four children. As hypothesized, cognitive processing affects reading through its relationship with language awareness as shown in a path analysis. The same children who have just completed their primary three and five years respectively are being followed up in a study of the comprehension of three types of ambiguous sentences (lexical, surface and deep ambiguities) and reading comprehension. A further study in progress examines the way in which children with specific reading disabilities comprehend pictorial ambiguities in cartoons, in sentences and in paragraphs. The children in the experimental groups in primary five and primary six are being compared with a chronological age control group and a reading age control group through quasi-experimental and quasi-interviewing situations. Thus far, results seem to indicate that the poor readers are also the ones who are poorly developed in becoming aware of the external and enduring characteristics of the word and of the printed page when there is little of the context surrounding spoken language to guide them.

The study of ambiguities, of jokes, of humour and incongruities is a fascinating one, not the least being the possibilities of steering language away from the formal way it has been treated (Leong, 1982). In her powerful book, *Children's Minds*, Margaret Donaldson (1978, p. 112) stated well the aims of schooling: ". . . to encourage the readiness to come to grips with incongruity and even to seek it out in a positive fashion, enjoying challenge." Seeking out incongruities and accommodating

them, testing hypotheses and predicting outcomes are some of the ways to help individuals better comprehend both words and textual materials.

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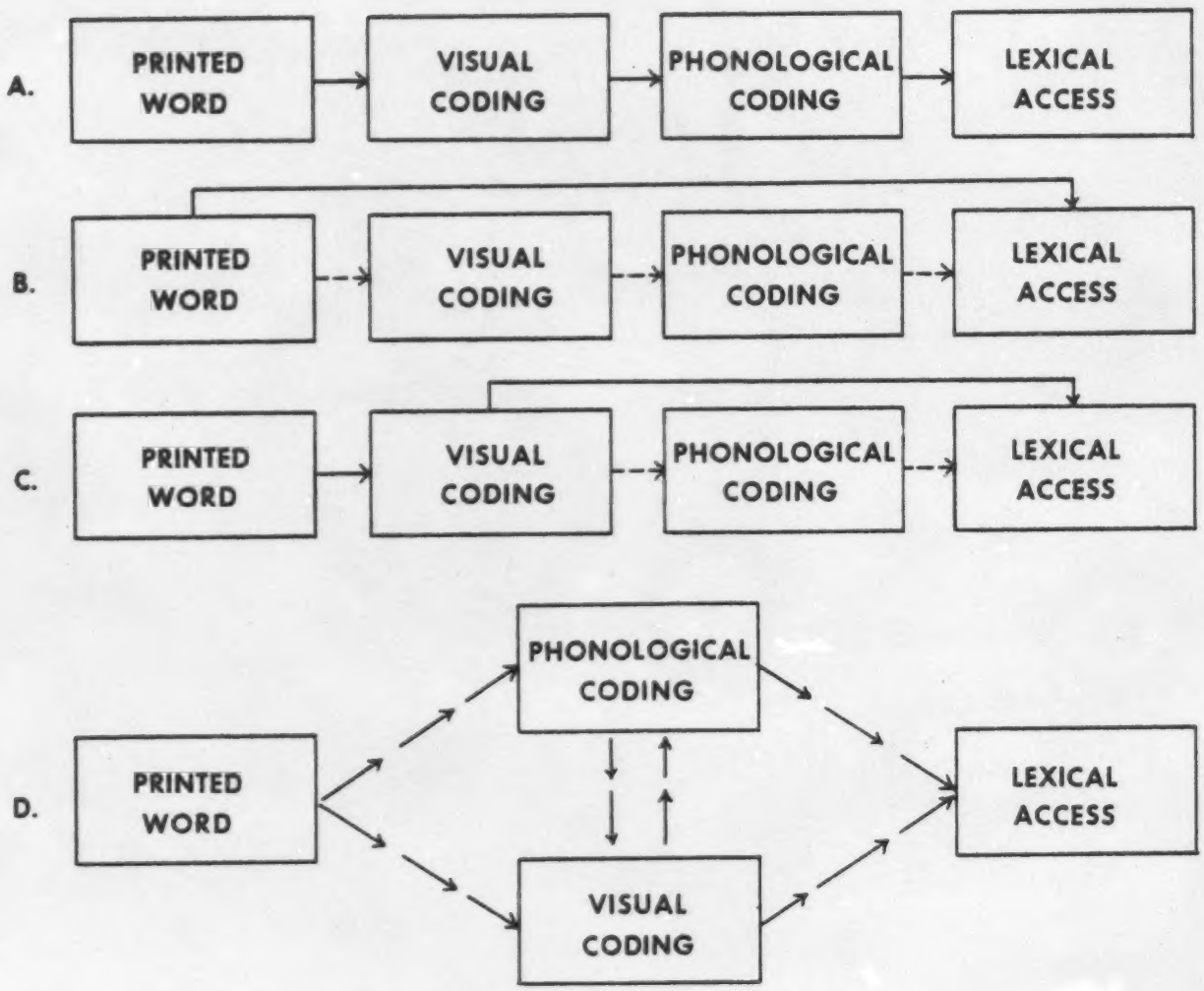
A.
PRINTED WORD
VISUAL CODING
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B.
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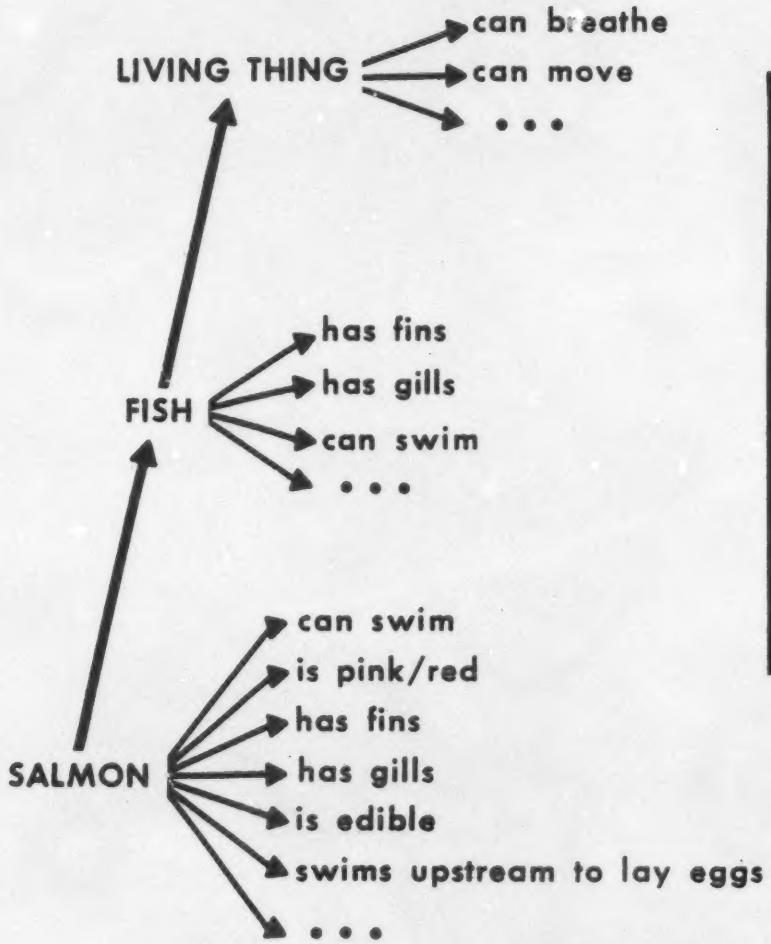

CATEGORY/ATTRIBUTE

Salmon/Fish

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An object
Living
Animate
Finned/Gilled
Edible
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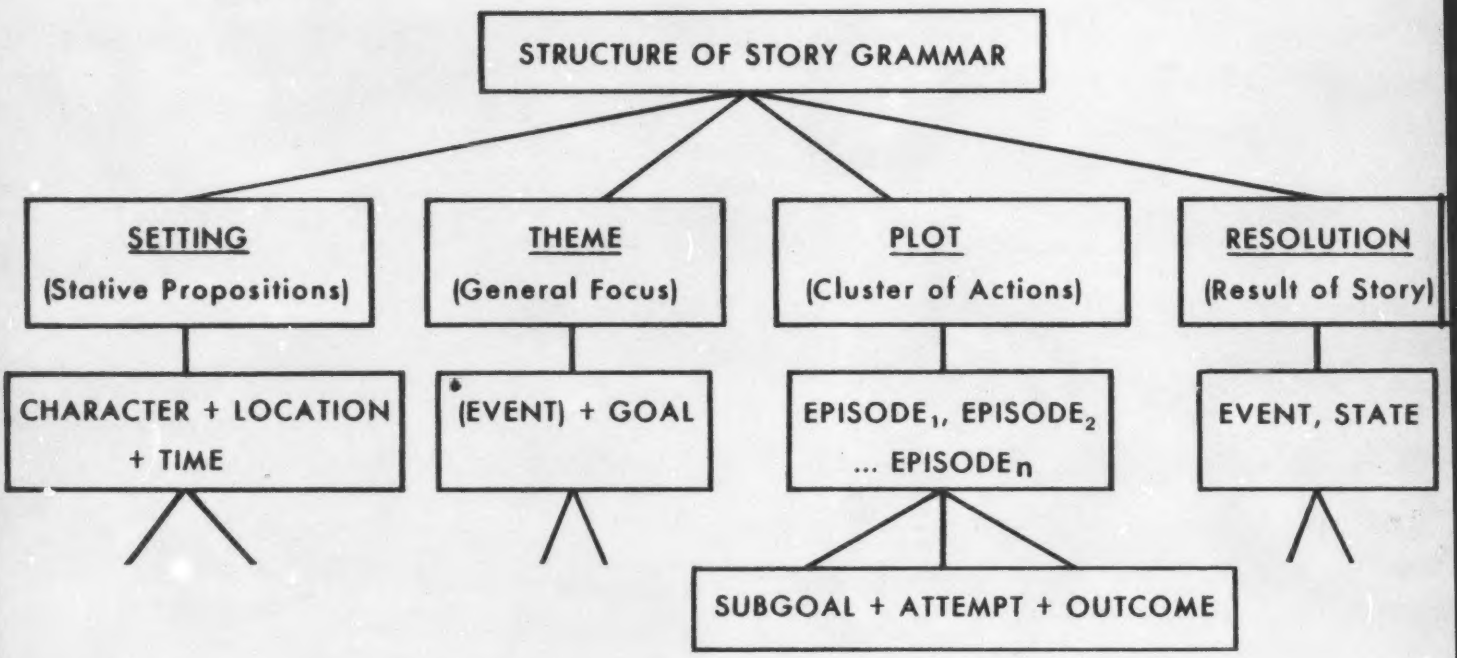

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schematic after P.W. Thorndyke (1977)